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PROMOTING LAW ENFORCEMENT FOR CHILD PROTECTION: A COMMUNITY ANALYSIS

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The Colorado Occupant Protection Project (COPP) intervention provided police with brief instruction concerning the importance of citations for drivers' failure to use child safety seats and special coupons to accompany citations. Coupons were exchangeable by drivers for a safety seat and brief training in its use, plus a waiver of the $50 citation fine. Over 4.5 years of archival records were employed, using an ABA design and a comparison community to evaluate the program. Few tickets were issued for nonuse of safety seats during the 3-year baseline in either community. Citations for nonuse of safety seats increased to over 50 per month during the intervention period at the test site, whereas rates remained essentially zero at the comparison site. After the COPP intervention was removed at the intervention site, citation rates for nonuse of safety seats decreased to about 15 per month. Differences between intervention conditions and settings were statistically significant. During the intervention, officers were 44 times more likely to write citations than were controls. Results suggested that a behavioral program can increase police citation writing for child protection purposes.

DESCRIPTORS: child safety seats, law enforcement, community behavior analysis, injury control, prevention

Since 1985, all states and the District of Columbia have required infants and young children traveling in motor vehicles to ride in federally approved child safety seats. Child safety seat laws are credited for dramatic increases in safety seat use, as well as significant reductions in childhood automobile crash injuries and fatalities (Bowman, Sanson-Fisher, & Webb, 1987; Decker, Dewey, Hutcheson, & Schaffner, 1984; Faber, 1986; Hoadley, Macrina, & Peterson, 1981; Margolis, Wagenaar, & Liu, 1988; Rood, Kraichy, & Carmen, 1987; Wagenaar & Webster, 1986; Wagenaar & Wiviott, 1986). However, many adults still transport children unprotected by a safety seat. These trips are associated with preventable death and disability.

Injury surpasses all major disease groups as the leading cause of death of children 1 to 4 years of age (Committee on Trauma Research, 1985). Nationally, children aged 1 to 4 years experienced an average annual death rate of 25.4 per 100,000 for all injury causes combined during the years 1980 to 1985, with the largest percentage caused by motor vehicle crashes (31%) (Waller, Baker, & Szocha, 1989). Unprotected children are five to eleven times more likely to be killed in a motor vehicle crash than are children in safety seats (Decker et al., 1984; Sewell, Hull, Fenner, Graff, & Pine, 1986). The risk of fatality might be reduced by 31% to 71% and the risk of serious injury might

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be reduced by 50% to 67% with the correct use of approved safety seats (Kahane, 1986; Yantz, Orleans, Lezotte, & Marine, 1988).

To attain significant reductions in childhood morbidity and mortality caused by motor vehicle crashes, behavior-change strategies should be implemented to insure greater use of safety seats (Goldbaum, 1986). Learning theory has been useful for promoting occupant protection. Researchers (Geller, 1984; Roberts, Fanurik, & Layfield, 1987; Rudd & Geller, 1985; Sleet, Hollenbach, & Hovell, 1986) have documented behaviorally based interventions applied to occupants and law enforcement officers for increasing safety belt and safety seat use. Law enforcement and media campaigns alerting drivers of safety belt and safety seat enforcement laws have increased safety belt use from 49% to 77% (Williams, Preusser, Blomberg, & Lund, 1987) and safety seat use from 12% to 51% (Wagenaar, Molnar, Businski, & Margolis, 1986; Wagenaar & Webster, 1986). Wagenaar's research (Wagenaar & Webster, 1986) also showed a 25% reduction in risk of injury with increased use of safety seats. When the nation's first mandatory safety seat law was implemented in Tennessee, the number of citations increased, the rate of use increased, and motor vehicle fatalities among children decreased (Decker et al., 1984).

Although several interventions have been directed toward drivers to increase safety seat use, relatively little attention has been focused on increasing police officers' enforcement of safety seat use laws. The purpose of this research was to evaluate the Colorado Occupant Protection Project's (COPP) effectiveness for increasing police officers' rate of issuing citations for nonuse of a safety seat.

METHOD

Setting and Participants

The subjects were police officers employed by the Grand Junction and Greeley police departments between January 1984 and June 30, 1988. During this time, Greeley employed an average of 89 officers (ranging from 86 to 92) and Grand Junction employed 63 officers (ranging from 59 to 66). Demographic information obtained from both departments showed similar patterns on a wide variety of variables (age, ethnic background, gender, marital status).

In 1980, Greeley had a total population of 53,006 and Grand Junction had a total population of 27,956 (Colorado State Demographer's Office, 1987). Census data suggested that both communities were similar in terms of number of persons per household, population density, median age, and median family income. There were 3,881 children 4 years of age and younger (7.3% of total population) in Greeley and 1,869 in Grand Junction (6.7% of total population) (U.S. Department of Commerce, 1981). The Colorado Department of Highways (1987) reported nearly identical incidence of vehicle crashes resulting in injury for the counties in which these communities are located (29.1 vs. 26 per 1,000 population per 100 miles traveled). The two communities are approximately 350 miles apart and geographically separated by the Rocky Mountains. Overall, the communities were considered similar, and it was assumed that the Rocky Mountain barrier would preclude significant amounts of experimental contamination by drivers traveling between communities.

Procedures

Colorado law officers rarely have time to provide lengthy education in the course of issuing a traffic citation. This is one of the reasons the Colorado Occupant Protection Project was developed, which combines health education strategies with law enforcement to improve compliance with the Colorado safety seat law. Program objectives were to (a) implement a referral network between police officers and health department staff for educational purposes, (b) conduct educational classes for high-risk motorists, (c) decrease the hypothesized natural aversive consequences to officers for writing tickets for nonuse of safety seats, and (d) make safety seats available to families who could not afford one.

Studies showed that enforcement of existing safety seat laws is rarely perceived by police officers as a priority (Houtchens, 1977). A conceptual analysis of potential competing behaviors among officers

suggested that officers do not enforce these laws because (a) administrative support is lacking, (b) they are unaware of the law's primary enforcement component, (c) they believe other traffic issues are of greater importance, or (d) they are reluctant to cite a driver who had not violated any other law.

The COPP intervention attempted to minimize reasons for low enforcement. This process involved reshaping the concept of ticket writing itself by (a) gaining police administrative endorsement for enforcement, (b) providing accurate information concerning primary enforcement of the law through officer workshops, and (c) establishing resources for motorists to acquire safety seats, thereby avoiding financial penalties when ticketed for violations.

A special referral coupon for noncompliant motorists was designed to use as an alternative to the traditional citation process. Feedback from officers suggested that giving a ticket ($50 fine) to drivers, who otherwise were law-abiding citizens, was an aversive procedure. The referral coupon was designed to accompany the citation. The coupon entitled drivers to have fines waived by attending an educational class from the health department and acquiring a safety seat (which was provided at no cost, if necessary). The officers were instructed that their use of these special coupons would help drivers get needed information as well as a safety seat.

The implementation of the COPP enforcement component took place during the first 6 months of 1987 in Greeley. Health department staff conducted eight training sessions at routinely scheduled officer briefings. The presentation to officers included information about the primary enforcement component of the safety seat law, a discussion of officers' attitudes toward enforcement, and a presentation of data to support the effectiveness of citations for increasing safety seat use and decreasing morbidity and mortality. The purpose of the referral coupon system was also explained. Officer training sessions lasted 30 min and reached the 79 officers who could write traffic citations.

Motorists who received the special coupons were entitled to attend a 45-min educational class at the local health department. Drivers viewed a film on consistent and proper use and practiced installing a safety seat. Class attendance made drivers eligible for free temporary use of a safety seat, if necessary, and the fine was waived when the validated special referral coupon was presented in court. Classes were conducted twice monthly.

Measurement

Violations of the safety seat law were transcribed from all police and court records for each city. In addition, the total number of all traffic-related violations, except parking violations, was recorded for both sites. Results were analyzed in terms of the frequency of safety seat citations in each city and in terms of the proportion of these citations to total traffic citations. However, from the more than 50 violations in the state common code, 10 specific traffic-related violations (expired plates, no valid registration, driver's license denied, no car insurance, speeding, careless driving, following too close, traffic control device, no stop for stop light, no stop for stop sign) were examined to assess possible response generalization across different types of citations.

All traffic citations written between 1984 and 1988 were reviewed, totaling over 100,000 records. Each record reviewed had a unique citation number and was available (by law) for public review; thus no formal consent was required. The observers were naive to the study purposes and followed standard data collection and data entry guidelines. Observer training included calculation of transcription agreements. Agreements were above 95%, and all disagreements were retranscribed. Ongoing supervision involved spot-checking by the first author for accurate transcriptions. Errors were rare and suggested very high reliability. Following the termination of the study, all records were reexamined by the first author and two assistants, and all identified errors were corrected. In addition, all data entry files were reviewed for errors which were corrected when found.

Experimental Design

Existing police records contained data on traffic citations issued in both Grand Junction and Greeley prior to, during, and following the intervention

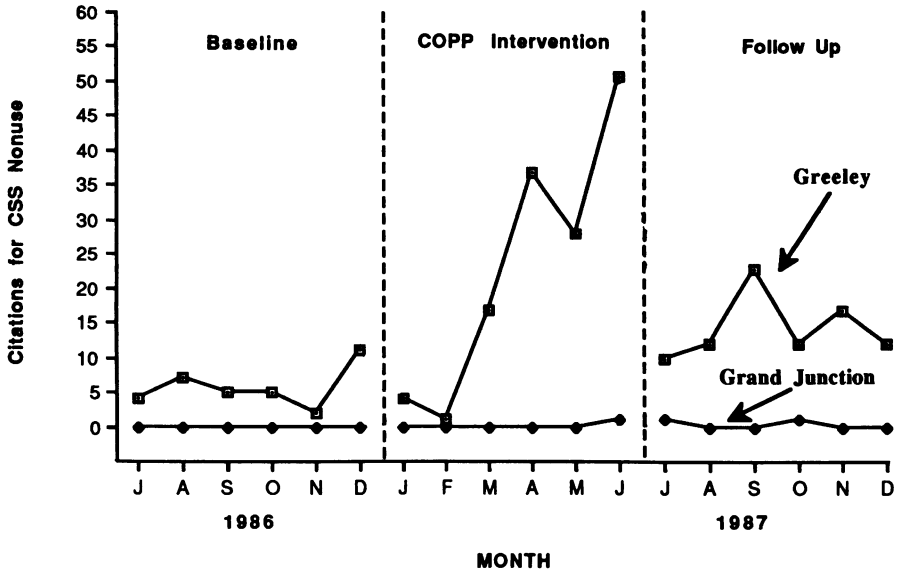

Figure 1. Frequency of ticketing for nonuse of safety seats by Greeley (intervention site) and Grand Junction (control site) officers for the 6-month baseline, intervention, and follow-up periods (July 1986 to December 1987). Officer training began in January 1987 and was completed within 8 weeks.

program. The COPP program was implemented in Greeley in January 1987 and was removed in July 1987, thus providing a naturally occurring reversal design. Identical archival records were reviewed in Grand Junction, which did not implement the COPP program, thus providing a control site.

RESULTS

Officer Ticketing Patterns

Figure 1 shows the number of safety seat citations for Greeley (the intervention site) and Grand Junction (the control site) for the 6-month intervals before, during, and following the COPP intervention in Greeley. During the baseline period, Grand Junction showed essentially no citations. Similarly, safety seat citations in Grand Junction remained near zero for the 6-month periods prior to, during, and following the intervention. Citations for nonuse of safety seats were under 10 per month for most of the baseline period in Greeley. During the intervention, citations increased to over 50 per month in Greeley. This rate fell to between 10 and 20 per month during the follow-up condition.

Both safety seat and all other traffic citations that occurred over a period of 4.5 years were examined. Citations for nonuse of safety seats were examined as a percentage of all traffic citations in both communities. With the exception of a temporary increase in proportion of safety seat citations during the intervention, trends in other citations remained unchanged over time. This suggests that the intervention affected safety seat citations exclusively.

Differences in the proportion of safety seat citations to all examined citations were analyzed between phases for the final 6 months of baseline, the 6 months of intervention, and for the 6 months of follow-up. Differences observed between conditions within the intervention site and between intervention phases across sites reached statistical significance.

Differential Change in Ticketing Patterns Across Sites

From 1984 to 1986 (i.e., prior to the intervention), both sites maintained stable levels of near-zero ticket writing for nonuse of safety seats (see Figure 2), with mean percentages below 1% of all traffic-related ticketing. Greeley (intervention site) had a mean of 0.24% (SD = 0.30%) and Grand Junction's (control site) mean was 0.04% (SD =

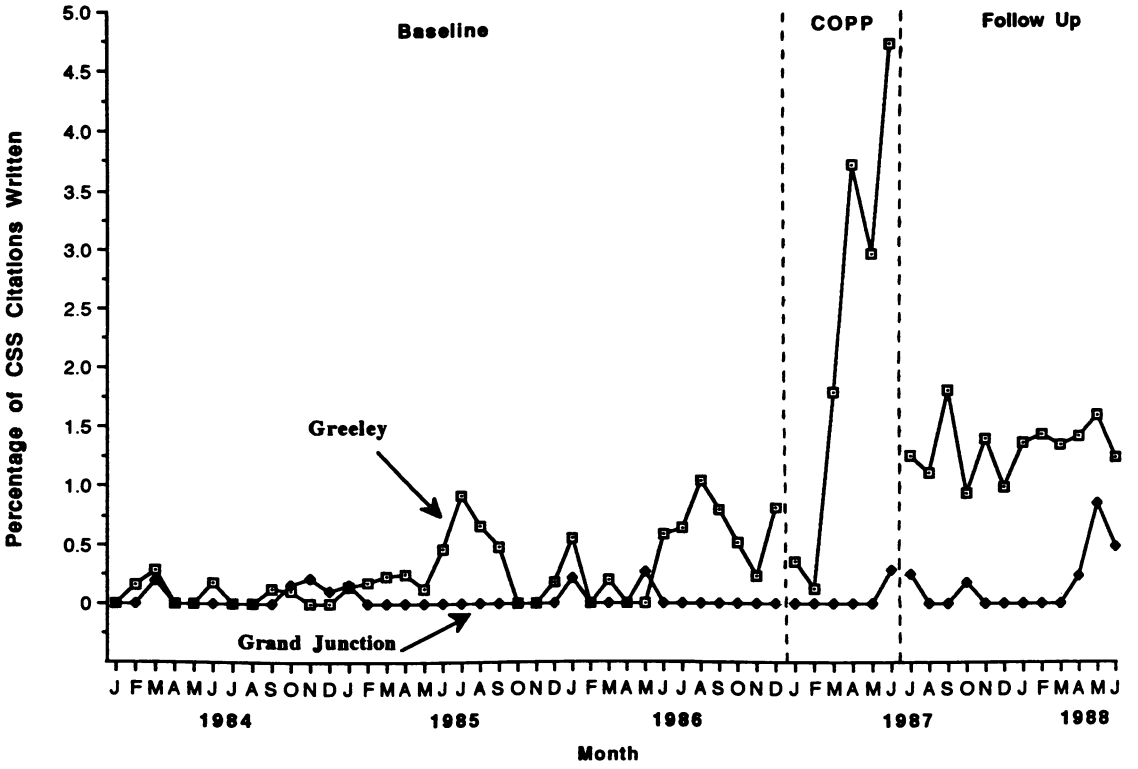

Figure 2. Percentage of citations for nonuse of safety seats written monthly compared to all traffic violations (except parking violations) in the intervention and control sites from January 1984 to June 30, 1988.

0.08%). Grand Junction officers maintained a stable near-zero rate of ticketing throughout the study, with a mean of 0.05% (SD = 0.11%) during the intervention phase and a mean of 0.16% (SD = 0.26%) during the follow-up phase.

In contrast, Greeley officers' rate of ticketing for nonuse of safety seats increased dramatically, reaching a maximum of 4.8% (M = 2.28%, SD = 1.86%) during the COPP intervention, and ticketing during the 1-year follow-up period remained higher than baseline, with a mean of 1.32% (SD = 0.25%).

To further substantiate the effect of the program, the pattern of returned coupons was examined in relation to citation rates. Figure 3 shows a lagged and lower magnitude of returned coupons that paralleled the pattern of citations in the intervention and follow-up conditions for the intervention site.

Finally, examination of quarterly percentages of all hazardous and regulatory citations in relation to all possible citations showed essentially no change in the control site over the 4.5 years of observation. Rates ranged from 0.1% to 0.2%. The intervention site ranged from 0.1% to 0.2% as well. However, these rates gradually increased to a stable rate just under 0.2% during the follow-up period. This subtle increase in general ticketing rate was attributed to an increase in the number of officers assigned to the traffic division. Because the subtle increase was apparent during the follow-up phase, and because rates of ticketing for nonuse of safety seats declined at the same time (in the absence of the intervention), we found no evidence of response generalization.

DISCUSSION

The COPP intervention increased enforcement of the safety seat use law. Without exception, across-time and across-city analyses of nonuse ticketing demonstrated similar enforcement trends, providing an exhaustive, reliable measure of nonuse ticketing in Greeley and Grand Junction. Exami-

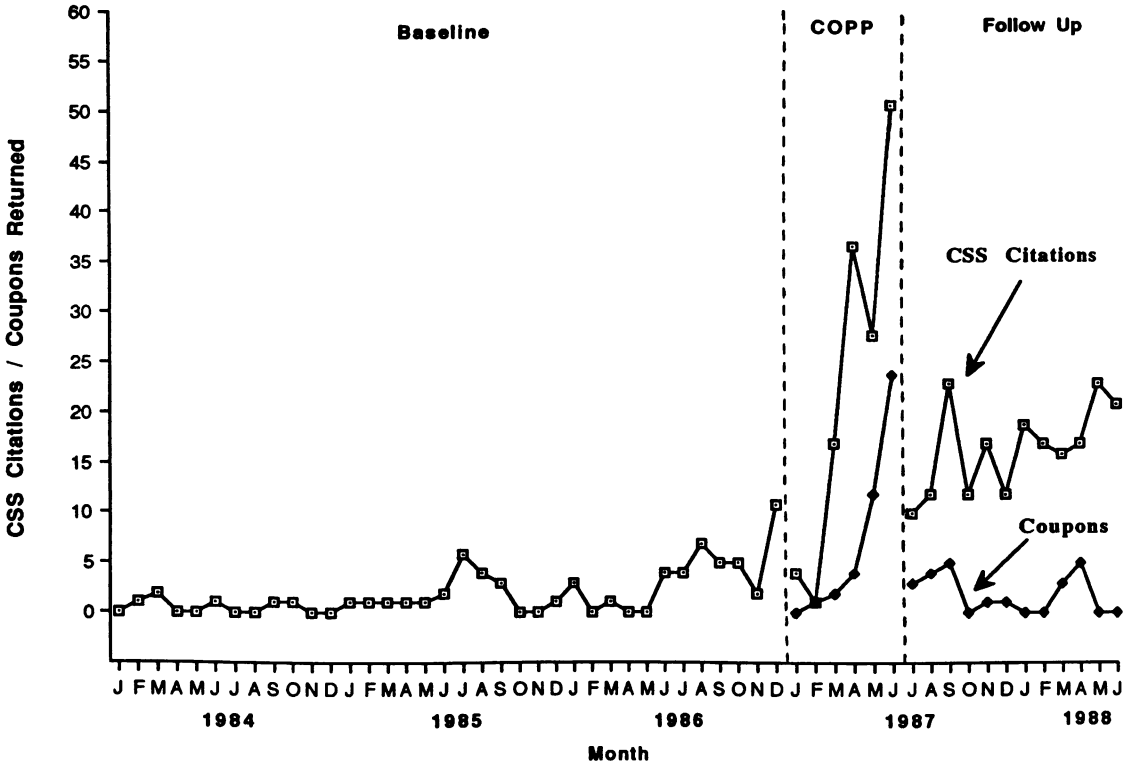

Figure 3. Frequency of ticketing for nonuse of safety seats by Greeley (intervention site) officers and frequency of referral coupon stubs returned to the Health Department from January 1984 to June 30, 1988.

nation of safety seat citations at the intervention site as percentages, absolute numbers, and population-adjusted rates (not shown) of all potential drivers yielded similar results. Enforcement of safety seat use in the intervention site increased significantly during COPP, with a modest increase maintained during the follow-up phase relative to essentially no nonuse ticketing during the 3-year baseline, or to the near-zero rate of enforcement at the control site. Officers in Greeley were almost 44 times more likely to enforce the safety seat use law during the intervention phase, relative to Grand Junction officers during the same period.

This analysis, although robust, did not allow adjustment for subtle baseline differences observed in the comparison of the two sites. This was not possible because individual officer badge numbers were not available from the intervention site. Examination of the actual mean proportions indicated extremely low enforcement rates. The intervention site showed a 1% rate of ticketing for nonuse of safety seats during the last year of baseline, while the control site remained at essentially zero. This difference was judged to be of little applied importance, even though statistically significant.

In December 1986, a new traffic division was implemented in the police department at the intervention site. This change became a potential confounding variable, possibly increasing ticket-writing rates in 1987 and 1988. Data collected for the 10 specific violations verified an increase in general ticketing. The increase occurred 7 months after the policy change. However, safety seat citations increased only during the intervention phase and decreased again during follow-up, demonstrating functional independence from the new traffic division and from other citations and responsiveness to the COPP intervention.

There was no mechanism to measure the number of nonuse warnings given by officers to noncompliant motorists or the number of tickets paid directly to the Colorado Department of Motor Ve-

hicles. Thus, the reported data reflect underreporting of total violations of safety seat laws for all conditions.

Examination of returned coupons in relation to citation rates provided partial confirmation that use of the coupons actually took place and contributed to the increase in citations. Because all drivers given coupons did not return them, this assessment represents an underestimate of coupon issuance and probably an underestimate of program compliance by police.

The archival records were transcribed by a team of assistants naive to the purpose of the evaluation and the intervention program. By transcribing 10 violations other than safety seat citations, the degree to which transcribers could discriminate that safety seat citations were the primary dependent variable was greatly diluted. Moreover, the COPP was designed to increase citation rates, yet most interventions are delivered directly to drivers and are designed to decrease violations and, hence, citation rates. Thus, if the observers had been biased due to some speculation about the public health program, it is likely their bias would have been in the direction to underrecord violations during the intervention period.

Formal percentage agreement calculations were obtained during the assistants' training, and these resulted in over 95% interobserver agreement. Ongoing supervision resulted in few errors, representing at least 95% agreement (although no formal percentage calculations were conducted), and all observed transcription errors were rerecorded from the original records. Thus, the reliability of these data was well beyond that often available for behavior analyses and certainly beyond that normally available for public health investigations.

This assessment was initiated well after the program had concluded and could be conducted only by use of archival data. When the assessment was planned, the results were not yet known; consequently, the degree to which the rates of safety seat citations would be reversed was not known. For this reason a hybrid design was adopted, using both a time series assessment and the contrast of a control and intervention city. The reversal design was not a true reversal and was not planned a priori. Rather, the county public health staff member who served as the program coordinator and liaison between the police department and the public health department resigned from the county health department to move to another state. The public health department did not replace this employee immediately and did not reassign another staff member to the task of coordinating the program. These decisions were reached in absence of any formal assessment of the effectiveness of the program and were dictated by chronic underfunding of public health education outreach services. The police department was not asked to discontinue the program, and the health department did not immediately discontinue the workshops and loaner program for drivers. Actually, the discontinuation of intervention procedures was a gradual change over a few months. Thus, the reversal period was a gradual discontinuation of the program of some unknown degree and speed.

The results, broadly defined, point out that programs such as this do not sustain their effects in absence of key personnel, such as the health program coordinator. Future programs are likely to require such central directors in order to initiate and sustain ongoing program procedures. Because this requires a substantial financial investment from poorly funded civil agencies, it is unlikely that most public health agencies will retain staff assigned for long periods. Perhaps instituting ongoing behavior analyses of effects from the outset would provide the needed assessment necessary (even if not sufficient) to sway senior administrators to sustain investments in programs such as this, where the effects are substantial.

This analysis provides a public health model for the application and assessment of behavior analysis at the community level. The use of archival records provided objective measures for an extended period prior to, during, and following intervention. These records enabled assessment of trends and variability over years, providing more reliable estimates of change once the intervention was initiated.

Although this study was not designed to examine injury or death rates, previous analyses (e.g., Bow-

man et al., 1987; Decker et al., 1984; Faber, 1986; Hoadley et al., 1981; Kahane, 1986; Margolis et al., 1988; Rood et al., 1987; Wagenaar & Webster, 1986; Wagenaar & Wiviott, 1986; Yantz et al., 1988) suggest that increased enforcement of safety seat laws should increase safety seat use, and these increased rates should reduce both the morbidity and mortality otherwise likely in automobile crashes. The effects of this program were so marked that extension of the procedures to other police departments and communities seems warranted. Future assessments should examine the effects of such a program on morbidity and mortality outcomes and cost effectiveness relative to medical care costs.

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